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Surgical Stabilization of Postpartum Symphyseal Instability: Two Cases and a Review of the Literature

Georg Osterhoff^a Christian Ossendorf^a Nina Ossendorf-Kimmich^b
Roland Zimmermann^b Guido A. Wanner^a Hans-Peter Simmen^a
Clément M.L. Werner^a

^aDivision of Trauma Surgery, Department of Surgery, and ^bDivision of Obstetrics, Perinatal Center, University Hospital Zurich, Zurich, Switzerland

Key Words

Postpartum symphyseal instability • Pelvic pain • Childbirth • Percutaneous iliosacral screw fixation • Pelvic ring stabilization

Abstract

During pregnancy, asymptomatic widening of the symphysis pubis by about one third is normal and considered physiological. However, peripartal relaxation of the symphyseal and sacroiliac ligaments may cause significant complaints conditions including pain and gait dysfunction. Usually, patients are treated by the application of pelvic binders and bed rest up to several weeks. Surgical stabilization is performed seldom, though it may be promising in selected patients. Based on 2 cases of postpartum symphyseal instability treated by surgical fixation, the current literature was reviewed systematically to evaluate the outcome and potential complications of surgical fixation of symphyseal instability. Thirteen articles met inclusion criteria and were analyzed in detail. Including the two cases presented, surgical stabilization of postpartum symphyseal instability has been described for 33 patients. In conclusion, though only based on case reports and case series, early surgical stabilization represents a decent treatment option for postpartum symphy-

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Introduction

During pregnancy, widening of the symphysis pubis by about one third is normal and considered physiological [1]. Patients are usually asymptomatic. However, peripartal relaxation of the symphyseal and sacroiliac (SI) ligaments may cause significant complaints conditions including pain and gait dysfunction leading to prolonged bed rest in distinctive patients [1–6]. Possible complications of postpartum pelvic instability are non-union or arthritis of the SI joints [7] with the need for consecutive extensive and long-lasting medical treatment [8]. Postpartal symphyseal widening is comparable to traumatic pelvic ring injuries. Accordingly, like in traumatic symphyseal rupture, vaginal wall tears and even severe hemorrhage are possible in the acute situation [9–11]. Usually,

Fig. 1. Case 1: 35-year-old woman with a symphyseal distance of 8 mm (**a**). The CT scan also reveals an osseous avulsion of the ipsilateral anterior sacrum (**b**, magnification). As the patient had local tenderness of the symphysis but not the SI joints, open reduction with symphyseal plate stabilization was performed (**c**). Note the migration of symphyseal screws (arrows) due to cyclic gait loading even though they were placed in crossed angles. CT and radiographs were taken unloaded in supine position.

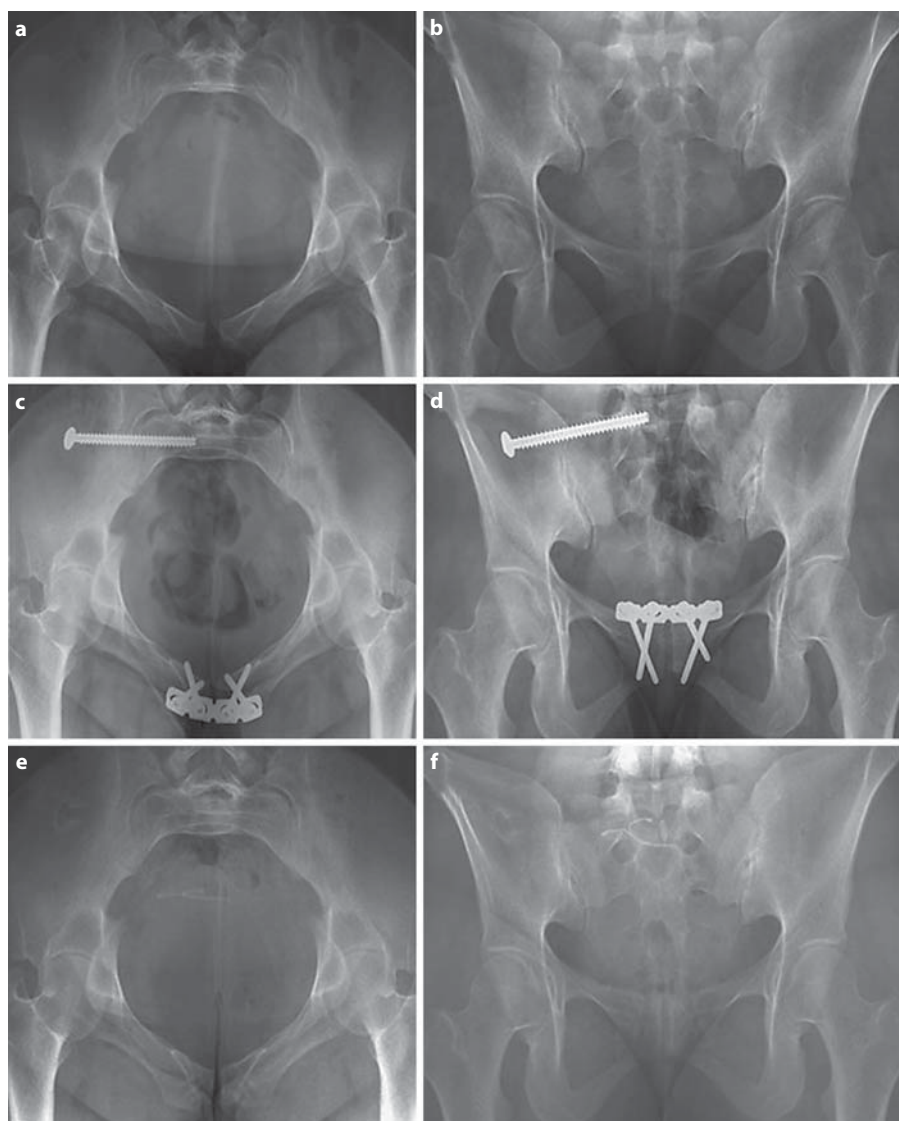
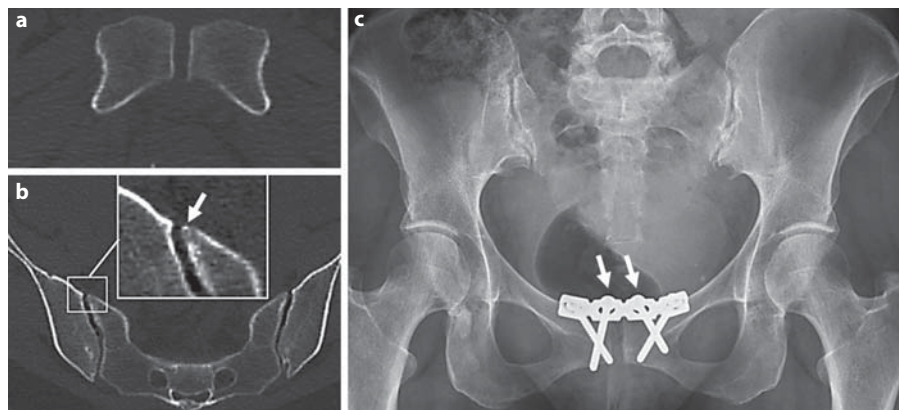


Fig. 2. Case 2: 31-year-old female with a symphyseal diathesis of 15 mm (**a**, **b**). As the patient presented with tenderness of the symphysis and both SI joints pronounced on the right side, open reduction with stabilization by a symphysis plate and SI screw fixation in S1 was performed (**c**, **d**, note the lumbarized vertebral body of S1). After 11 months, plate and screw were removed (**e**, **f**). Radiographs were taken unloaded in supine position.

patients are treated by the application of pelvic binders and bedrest up to several weeks. In addition to a vague prospect of success, potential complications and hazards of this conservative treatment include thromboembolism and musculoskeletal deconditioning [12–14]. In contrast, in selected patients, a more aggressive yet more targeted procedure may be promising.

We report 2 cases of postpartum symphyseal instability treated by surgical fixation at our institution and systematically reviewed the current literature to evaluate the outcome and potential complications of surgical fixation of symphyseal instability, as well as to discuss its potential pitfalls.

Literature

We performed a review of all studies dealing with the surgical treatment of postpartum symphyseal instability published between 1970 and January 2011. Articles concerning nonsurgical treatment, diagnostics and trauma other than childbirth as well as review articles or such written in languages other than English, German or French were excluded from the present study.

All studies were derived from Medline using the terms ‘symphysis’ AND (‘disruption’ OR ‘instability’ OR ‘diastasis’ OR ‘separation’) AND (‘childbirth’ OR ‘postpartum’ OR ‘pregnancy’).

Cases

Case 1

A 35-year-old gravida two para one (height 166 cm, weight before pregnancy 54 kg) entered the obstetric ward at 39 5/7 weeks of gestation with premature rupture of the membranes. The prenatal course was dominated by light vaginal bleeding with 8 weeks of gestation and lasting preterm contractions since the 29th week of gestation with the need of hospitalization and intravenous tocolysis with the beta-sympathomimetic drug hexoprenaline for the period of 4 weeks. We started inducing labor with 39 6/7 gestational weeks by intravenous administration of oxytocin. After 5 h and 14 min of first stage of labor and 1 h and 23 min of second stage of labor, a healthy boy of 3,390 g (43rd centile) was delivered out of a vertex position. The third stage of labor was uneventful with an estimated blood loss of 250 ml. A few hours after the delivery, the woman complained about strong, immobilizing pain in the symphyseal region. A CT scan revealed a symphyseal distance of 8 mm (fig. 1). Pelvic pain decreased when lying or sitting. In addition, the patient reported pain localization in projection to the SI joint. Physical examination revealed local tenderness of the symphysis but not the SI joints. Lateral compression to the pelvis showed minor instability. There were no clinical signs of neurologic pathology. A provided pelvic binder brought only little pain relief and walking was not possible due to severe, immobilizing sore in the symphyseal area. Thus, open reduction and anterior fixation via a Pfannenstiel approach was performed 3 days after the delivery. Intraoperatively, the symphysis showed gross insta-

bility when palpated digitally. The symphysis was reduced by manual lateral compression and fixation was achieved by a 4-hole symphyseal plate with ipsilateral crossing screws (fig. 1). Subsequently, the patient showed an uneventful recovery with immediate mobilization and discharge from hospital 5 days after the operation. For three months postoperatively, there was a slight pain in the right SI joint, and pain medication was needed for two weeks. Follow-up radiographies showed minimal screw migration of about 2 mm and good symphyseal reduction. At 1 year, the plate was removed. Wound healing was uneventful. At the latest follow-up 22 months after the initial injury, the patient was free of complaints.

Case 2

A 31-year-old gravida two para one (height 170 cm, weight before pregnancy 78 kg) entered the obstetrical ward at 41 1/7 gestational weeks for planned induction of labor with a singleton pregnancy in vertex position. After 2 h and 39 min of first stage of labor and 1 h and 2 min of second stage of labor the woman delivered a healthy female newborn over a small mediolateral episiotomy. The infant weighted 3,640 g (66th centile). The early postpartum period was normal. During the stay on our ward the patient showed hindered mobilization with sustained pain in both legs and the pubic symphysis.

The patient presented with tenderness of the symphysis and both SI joints pronounced on the right side. With unilateral weight bearing on the right side she additionally had posterior pain. Radiographic assessment with plane anteroposterior, inlet, outlet pelvic projections showed a symphyseal diastasis of 15 mm (fig. 2). As a consequence, a pelvic binder and walking frame were initialized, but brought only little pain relief. Therefore, open reduction and anteroposterior fixation was performed 6 days after delivery (fig. 2, 3). Via a Pfannenstiel approach, the symphysis was reduced using a Weber clamp and fixation was achieved by a 4-hole symphyseal plate with ipsilateral crossing screws. Additionally, a cannulated fully threaded SI screw (7.3 mm) was inserted in the right pedicle of SI. Afterwards, the mobilization with full weight bearing of the patient improved continuously, even though prolonged. Postoperative radiographs showed a symphyseal distance of 7 mm and no screw malpositioning. The patient was discharged from hospital 10 days later. At 6 weeks postoperatively, the patient presented with remarkable decrease of the pel-



Fig. 3. Postoperative photograph of the wound after SI screw placement.

vic complaints. Walking and range of movement of both hip joints were free. The patient stated an isolated hyposensitivity in the right L5 area that disappeared after 8 weeks. After 11 months, plate and screw were removed uneventfully. Thirteen months after the initial injury, the patient was free of complaints.

Results

The Medline search yielded 84 articles of which 6 were reviews, 47 were nonsurgical or diagnostic, five were reports of animal experiments, and five were written using other languages than those named above. In 8 case reports the symphyseal diastasis did not result from childbirth alone, e.g. trauma, or infection.

Thus, 13 articles [3, 9–11, 15–23] met the inclusion criteria and were analyzed in detail (table 1). Three articles were case series [3, 18, 21], the rest were reports of single cases [9–11, 15–17, 19, 20, 22, 23].

Including the 2 cases presented above, surgical stabilization of postpartum symphyseal instability has been described for 33 patients. Most of them were older than 30 years [10, 16, 18–21]. The studies' median follow-up was 12 months (range of means 1.5 months to 6 years).

Radiographically, postpartum symphyseal instabilities can biomechanically be compared to anteroposterior compression injuries (APC) of the pelvis according to the classification system proposed by Young et al. [24]. APC I injuries are associated with symphyseal widening <2.5 cm and intact anterior SI ligaments, APC II injuries with symphyseal widening >2.5 cm and intact posterior SI ligaments and APC III injuries with a SI disruption. Even though APC I-like injuries were reported in 7 patients [3, 18] and APC III-like injuries in 3 patients [10, 20, 22], childbirth mainly led to pelvic instabilities comparable to APC II injuries [3, 9, 11, 15–17, 19, 21].

Concomitant injuries of the genitourinary tract seem to be common. Due to the symphyseal disruption, especially tears of the ventral vaginal wall and the urethra occurred [9–11, 23] and had to be reconstructed surgically sometimes. In one case, a rupture of vagina and uterus resulted in massive hemorrhage and intermittent cardiac arrest [10]. Heath et al. [19] reported a neuropathy of the lateral femoral cutaneous nerve.

For definitive treatment, external fixation was used in 6 cases [9–11, 15–17] and internal fixation (anterior plate/iliosacral screw) was used in 16 cases [18–23]. Twelve patients were treated by arthrodesis (symphysis pubis and/or SI joints) [3, 21].

In most cases, anterior fixation was used [9–11, 15–19, 21, 23]. Combined anterior and posterior stabilization [18, 20, 22] was chosen predominantly in patients with APC III-like injuries. Including our cases, only six studies reported about the time to full weight bearing without pain [9–11, 17, 22], this was 4–16 weeks. In face of the small number of patients, a statement on a correlation with injury severity or method of fixation (internal/external) was not possible.

External fixation was associated with pin tract infection in 2/6 patients and loss of reduction in 1/6 patients, which led to revision surgery in 2/6 patients [15, 16]. Internal fixation was associated with loss of reduction in 2/16 and implant failure in 2/16 patients, which led to revision surgery in 1/16 patients [21].

Hagen [3] primarily treated 8 patients by arthrodesis of either the symphysis and/or the SI joints; this resulted in SI ankylosis in 6/8 and in nonunion in 2/8 patients. Najibi et al. [21] reported on 3 patients with chronic pain who were treated by symphyseal fusion 2 of whom had unsatisfactory results.

Discussion

The aim of the present study was to systematically review the current literature with regard to outcome and potential complications of surgical fixation of symphyseal instability and to present 2 own cases.

The patients presented in our study underwent early stabilization by symphyseal plate fixation and, in case 2, an additional minimally invasive percutaneous SI screw fixation. Although pelvic pain is usually linked to a diastasis of more than 10 mm, both patients had immobilizing pain and thus – as conservative treatment initially failed – the decision for surgical stabilization was made.

Anterior fixation is the common method of stabilization if surgery is taken into consideration [9–11, 15, 16, 18, 19, 21]. A difference in functional outcome comparing internal and external fixation was not demonstrable. Yet, external fixation is associated with the disadvantage of an increased risk of infection and is linked to secondary loss of reduction [10, 15, 16]. Thus, the treatment of choice of fixation for postpartum symphyseal instabilities seems to be anterior plate fixation.

Surgical treatment in patients with chronic pain led to an inferior outcome [3, 21]. However, the level of evidence was low as all but three studies represent reports of single cases.

Table 1. Overview of the literature on surgical treatment of postpartum symphyseal instability

Author	Year	n	Age years	Pelvic Instability	Conser-vative treatment weeks	Fixation	Anterior/posterior	Follow-up months	Complications	Revision surgery	Pain-free FWB weeks
Hagen [3]	1974	8 (operative)	N/A	APC II (2), APC I (6)	12–78	arthrodesis	anterior (2)/ SIJ (4)/both (2)	72	nonunion (2), ankylosis (6)	re-arthrodesis ant/post (1)	N/A
Petersen and Rasmussen [15]	1992	1	30	APC II	0	external	anterior	9	pin tract infection	0	N/A
Kotwal and Mittal [16]	1996	1	35	APC II	4	external	anterior	12	pin tract infection	change to internal fixation	N/A
Pennig et al. [17]	1997	1	21	APC II	0	external	anterior	4	0	0	16
Rommens [18]	1997	3	32	APC II (2), APC I (1)	16/34/20	internal	anterior (2)/ combined (1)	6.5 (2)/ 6 (1)	0	0	N/A
Klotz et al. [23]	1998	1	25	N/A	0	internal	anterior	12	0	0	N/A
Heath and Gherman [19]	1999	1	31	APC II	2	internal	anterior	4	0	0	N/A
Seth et al. [9]	2003	1	N/A	APC II	0	external	anterior	3	0	0	12
Hierholzer et al. [20]	2007	1	32	APC III	0.5	internal	combined	29	0	0	N/A
Chang and Wu [10]	2008	1	36	APC III	0	external	anterior	18	loss of reduction	reduction, second Ex fix	4
Dunivan et al. [11]	2009	1	N/A	APC II	0	external	anterior	1.5	0	0	> 6
Najibi et al. [21]	2010	10	32	APC II	16–26 (3), 64–128 (3)	internal (7)/ arthrodesis (3)	anterior	31	loss of reduction (2), implant failure (2)	fusion after implant failure (1), removal b/o dyspareunia (1)	N/A
Hou et al. [22]	2011	1 (operative)	28	APC III	0.5	internal	combined	12	0	0	16
Present study		2	34	APC I/ APC II	0	internal	anterior (1)/ combined (1)	12	0	0	12/6

Numbers in brackets indicate number of patients.

Pain-free FWB = Time to full weight bearing without pain; N/A = no information given by the cited article; APC I/II/III = pelvic injury pattern analogue to antero-posterior compression I/II/III injuries described by Young et al.; SIJ = sacroiliac joints; b/o = because of.

Peripartal widening of the symphysis pubis and the SI joints is a physiological phenomenon [1–3]. Though most patients are asymptomatic, some complain of pain and/or instability or become symptomatic or even walking disabled later [4, 13, 14, 18, 20, 25, 26]. A diastasis of more than 10 mm is regarded as pathologic and associated with pain [5, 6, 25]. In contrast, in a cohort of 23 patients with symptomatic ‘pelvic relaxation’ syndrome, 19 had a symphyseal diastasis of less than 5 mm [3]. We conclude that the amount of symphyseal widening does not correlate with the extent of pain in postpartum women.

Most patients are treated nonoperatively by the application of pelvic binders. However, conservative treatment implies bedrest for up to 6 weeks [12–14], although it is known that length of hospitalization and immobility are the main risk factors for pressure ulcers, thromboembolism and pneumonia [27, 28]. Furthermore, nonoperative treatment of symphyseal instability is almost always associated with persistent pain and disability in walking for 6–16 weeks [3, 12–14, 29].

Surgical stabilization is rarely suggested and if so only in patients with symphyseal widening of more than 2.5

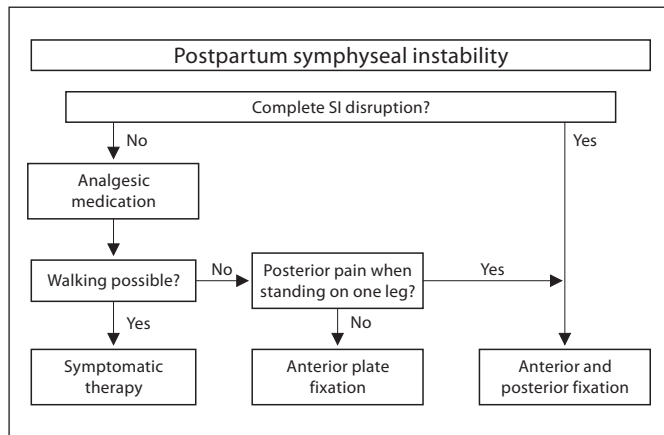


Fig. 4. Treatment algorithm for postpartum symphyseal instability.

cm [15, 20, 30] or in patients with failed conservative treatment [18, 25, 31] or concomitant soft tissue injuries [12, 32]. Concomitant injuries of the genito-urinary tract are common and usually have to be reconstructed surgically [9–11, 23]. In recent studies, patients with persistent postpartum pain operated after one year of persistent pain showed no difference in operative vs. conservative treatment [33]. This is consistent with the case series reported by Najibi et al. [21] who yielded only unsatisfactory results after symphyseal fusion of patients with chronic pain (>6 months). Thus, if indicated, early surgical intervention is suggested.

In patients with additional posterior pelvic ring instability posterior fixation may sometimes be indicated. Internal posterior fixation used to be invasive with extended approaches combining symphyseal plating and SI arthrodesis using open dorsal approaches. Hagen [3], for instance, performed SI arthrodesis in patients with

chronic pelvic ring pain after childbirth with consecutive non-weight bearing for up to 14 weeks. With the establishment of techniques like percutaneous iliosacral screw fixation [20, 22, 34], however, early minimally invasive stabilization is nowadays possible.

Though some authors advise to give birth by caesarean section after surgical stabilization [16], normal vaginal delivery 15 months postoperatively with implant in situ was reported [20].

In conclusion, though only based on case reports and case series, early surgical stabilization represents a decent treatment option for postpartum symphyseal instability and may be indicated by pain or walking disability alone. With regard to the clinical outcome comparing internal and external fixation, no differences were demonstrable. However, the rate of infection was higher in patients treated by external fixation.

Based on these data we propose the treatment algorithm shown in figure 4. If walking is possible at all under analgesic medication, symptomatic treatment will most likely achieve good results in most of the patients. Yet, there is a need for prospective randomized trials of surgical versus conservative management of postpartum symphyseal instability.

Consent

Written informed consent was obtained from both patients for publication of their data and any accompanying images in this case report.

Disclosure Statement

The authors declare that they have no competing interests.

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